What is claimed is:

1. A method of making a multilayer optical film, comprising:

(a) providing at least a first and a second stream of resin, wherein the first stream of resin is a copolymer of polyethylene naphthalate (coPEN) and the second stream of resin is polymethyl methacrylate (PMMA),

(b) dividing the first and second streams into a plurality of layers such that the layers of the first stream are interleaved with the layers of the second stream to yield a composite stream;

(c) coextruding the composite stream through a die to form a multilayer web wherein each layer is generally parallel to the major surface of adjacent layers, wherein the coPEN and PMMA resins are coextruded at a melt temperature of about 260°C, and wherein the birefringence of the coPEN resin is reduced by about 0.02 units or less compared to the birefringence of a homopolymer PEN resin for a given draw ratio; and

(d) casting the multilayer web onto a casting roll to form a cast multilayer film.

2. The method of claim 1, further comprising after step (b):

(e) passing the composite stream into a multiplier where the composite stream is divided into a plurality of substreams, the multiplier expanding at least one of the substreams in a direction transverse to its direction of flow; and

(f) recombining the substreams to increase the number of layers in the composite stream.

3. The method of claim 1, further comprising:

(e) quenching the multilayer web during the casting step.

METHOD FOR MAKING coPEN/PMMA MULTILAYER OPTICAL FILMS

Abstract of the Disclosure

Methods and apparatuses are provided for the manufacture of coextruded polymeric multilayer optical films. The multilayer optical films have an ordered arrangement of layers of two or more materials having particular layer thicknesses and a prescribed layer thickness gradient throughout the multilayer optical stack. The methods and apparatuses described allow improved control over individual layer thicknesses, layer thickness gradients, indices of refraction, interlayer adhesion, and surface characteristics of the optical films. The methods and apparatuses described are useful for making interference polarizers, mirrors, and colored films that are optically effective over diverse portions of the ultraviolet, visible, and infrared spectra.